EXERCISE

Q1. Select the best answer for the following MCQs

i. In which operating system, same type of jobs are grouped together and executed one by one?
   a. Multiprogramming operating system
   b. Batch processing operating system
   c. Real time operating system
   d. Time sharing operating system

ii. In _____ operating system CPU is rapidly switched between programs so that all the programs are executed at the same time.
   a. Multiprogramming operating system
   b. Batch processing operating system
   c. Real time operating system
   d. Time sharing operating system

iii. Which operating system runs applications with very nice precise timing and provides immediate response to avoid safety hazards?
   a. Real time operating system
   b. Multitasking operating system
   c. Multi Processing operating system
   d. Distributed operating system

iv. _____ operating system divides a task into many subtasks and process them independelly using many processors

a. Real time operating system

b. Multitasking operating system

c. Parallel processing operating system

d. Multitasking operating system

v. Which operating system is used in home appliances?

a. Time sharing operating system

b. Distributed operating system

c. Parallel processing system

d. Embedded operating system

vi. Which of the following manages allocation of computer resources during program execution?

a. Memory management

b. Process management

c. IO management

d. File management

vii. Which of the following creates user groups and assigns privileges to them?

a. Process management

b. I/O management

c. File management

d. Network management

viii. In which state, a process is waiting to be assigned to the processor by the operating system scheduler?

a. New state

b. Ready state

c. Waiting state

d. Running state

Answers

I	Batch processing operating system	ii.	Time sharing operating system
iii.	Real time operating system	iv.	Parallel operating system
v.	Embedded operating system	vi.	Process management
vii.	Network management	viii.	Running state

SHORT QUESTIONS

Q.2 Write short answers of the following questions

i.   What is the purpose of the operating system in a computer?

Answer

Purpose of an Operating System

The purpose *of* an operating system in a computer is to manage the computer's resources such as the central processing unit, memory disk drives and printers. Operating system establishes a user interface, executes and provides services for applications software.

ii.   What is Graphical User Interface (GUI)?

Answer

Graphical User Interface

A graphical user interface (GUI) is a type of user interface that allows users to navigate around a computer or device and complete actions via visual indicators and graphical icons.

iii.   Mention three advantages of UNIX operating system?

Answer

Advantages of UNIX operating system

1. UNIX provides greater processing power and better security than Windows operating system.
2. Computers running UNIX operating system rarely have malware attack.
3. UNIX is available for a wide range of computer systems from microcomputers to mainframes.

iv.   Differentiate between multiprogramming and time-sharing operating systems.

Answer

Difference

Main difference between multiprogramming and time-sharing is the effective utilization of CPU time, by allowing several programs to use the CPU at the same time but time-sharing of a computing facility by several users that

want to use the same facility at the same time. Each user on a time-sharing system get their own terminal and gets the feeling that they are using the CPU alone.

v.   Why multiprocessing operating systems have been developed?

Answer

Development of Multiprocessing Operating System

Multiprocessing operating systems have been developed because they were used to obtain very high speed to process large amount of data. It executes a single program using many CPUs at the same time to improve processing speed.

vi.   Differentiate between single-user and multi-user operating system.

Answer

Difference

The operating system that allows only one person to operate the computer at a time is known as **single-user operating system** whereas the operating system that allows many users on different terminals or microcomputers to use the resources of single central computer (server) in a network is known as **multi-user operating system.**

vii.   Why memory management is required in a computer?

Answer

Memory management is required in a computer because it controls and manages the operation of main memory during the operation *of* computer. It allocates space to programs that are loaded in main memory for execution. When a program closes and updates the memory status, it keeps track of freed memory.

viii.   Why protection system is required in a computer?

Answer

Protection system is required in a computer because it ensures that each resource of computer is used according to the privileges given to users by the system administrator. It creates account for each user and gives privileges to prevent misuse of the system. It provides password to all the users to maintain network security.

ix.   What is a thread?

Answer

Thread

A Thread is a basic ordered sequence of instructions within a process that can be executed independently.

x.   Differentiate between multiprogramming ang multithreading by giving one example of each.

Answer

Difference

Multiprogramming	Multithreading
In multiprogramming, many programs are loaded in memory but the CPU only executes one program at a time. Other programs wait until the previous program is executed out or blocked	The process of executing multiple threads simultaneously is known as multithreading. Multithreading is an execution method of a program that allows a single process to run multiple thread at the same time.
Example When a user loads program 1 (say MS-Word) and program 2 (say C-language compiler). The CPU is able to execute only one program i.e. MS-Word or C-language compiler.	Example A user is typing paragraph on MS-Word. But in background one more thread is running and checking the spelling mistakes. As soon as user is doing a typing work, the other thread notifies the user about the spelling mistakes

EXTENSIVE QUESTIONS

Q.3 Write long answers of the following questions

i.   Mention the tasks performed by the operating system.

Answer

Tasks Performed by OS

Operating system performs the following tasks

1. Operating system loads application/system software into main memory and executes it.
2. Operating system controls the operation of main memory and external storage devices
3. Operating system manages files and folders on storage devices such as hard disk USB flash drive etc.
4. Operating system manages the operations of all the input/output devices.
5. Operating system allows multitasking to handle several tasks at the same time such as running a spreadsheet software and a word-processor simultaneously.
6. Operating system performs network operations which enable a number of users to communicate with each other in a network environment and share computer resources such as CPU main memory, hard disk, printer, Internet etc.
7. Operating system detects hardware failures.
8. Operating system provides security through username and password.

ii.   **Compare DOS with Windows operating system.**

Answer

	DOS	Windows
Definition	DOS (Disk Operating System) are simple text command operating	Windows is a range of graphical interface operating systems that

	systems that were popular from 1981 to 1995.	are developed and sold by Microsoft.
Interface	DOS used a text-based interface that required text and codes to operate.	Windows uses graphics, images and text.
Input System	Text is used as the basic input system commands.	Uses a mouse for all operating system input.
Multitasking	DOS is unable to run multiple processes at the same time.	Windows allows more than one process to work simultaneously.
Current Users	More ideally used for prototyping, testing and making automated systems.	Used worldwide as the most popular operating system.

iii.   Describe the following types of operating systems

    a. Real-time operating system

    b. Parallel processing operating system

    c. Embedded operating system

Answer

    a. Real-time Operating System

A real-time operating system is a software that runs real-time applications that must process data as soon as it comes and provides immediate response. Real-time operating system executes special applications within specified time with high reliability. It is commonly used in

1. Space research programs
2. Real-time traffic control
3. To control industrial processes such as oil refining

b. Parallel Processing Operating System

A parallel processing operating system is a software that executes programs developed in a parallel programming language. It uses many processors at the same time. In a parallel processing system, the task of a program that requires many calculations is divided into many smaller tasks and multiple processors process these at the same time. Parallel processing operating systems are used in supercomputers that have thousands of processors.

c. Embedded Operating System

An embedded operating system is a built-in operating system which 1s embedded in the hardware of the device. It controls the operation of devices such as

1. Microwave oven
2. Television
3. Camera
4. Washing Machine
5. Games

An embedded operating system runs automatically when the device is turned on and performs specific task.

iv.   Define the following terms.

a. File management

b. I/O management

c. Network management

d. Command-Interpreter

Answer

a. File Management

File management is the part of operating system that manages files and folders on storage devices such as hard disk, USB flash drive and DVD. It allows computer user to perform operations such as:

1. Creating
2. Copying
3. Moving
4. Renaming
5. Deleting
6. Searching files and folders

File management also allows the user to perform read, write, open and close operations on files and folders.

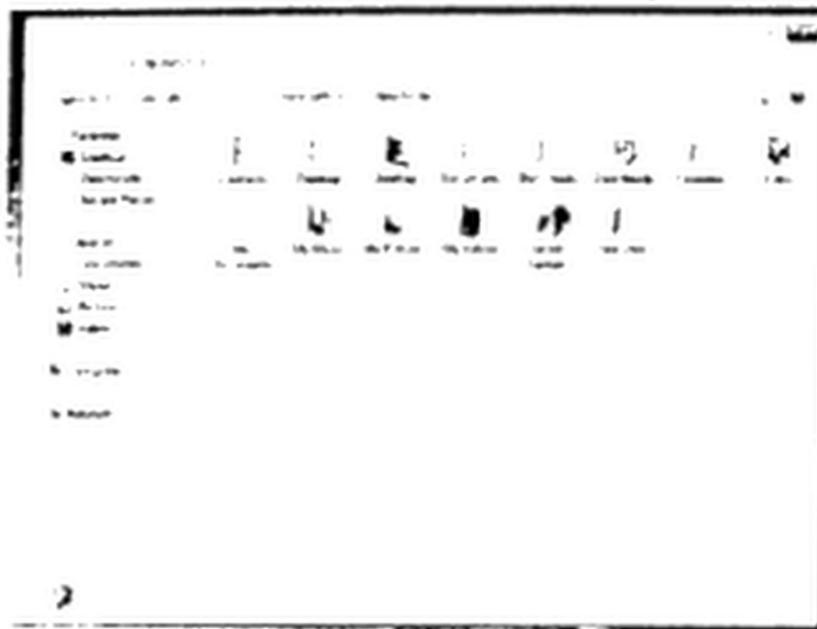Figure 1.6 shows the management of files in various folders by OS

Figure 1.6 File Management

b. I/O Management

I/O management is the part of operating system that controls all the input/output operations during program execution. It manages all the input/output operations of input/output and storage devices. Efficient I/O management improves the performance of computer.

Example

There are three programs **A**, **B** and **C** which are using the printer. Now the OS will decide which program to use the printer first. The OS will set a queue and each program will get the printer by its turn.

c. Network Management

Network management is the part of network operating system that monitors and manages the resources of a network. It allows to create user

groups and assigns privileges to them. It shares the network resources among users and it detects and fixes network problems.

d. Command-Interpreter

Command-Interpreter is the part of operating system that provides interface between user and the computer system. It is a file in operating system that reads and executes user commands that are entered as text through keyboard

Example

Windows operating system uses the **cmd.exe** file as command-interpreter.

v.   Describe the five states of process with diagram.

Answer

States of a Process

There are five states of a process which are as follows

1. New state
2. Ready state
3. Running state
4. Blocked state/Waiting state
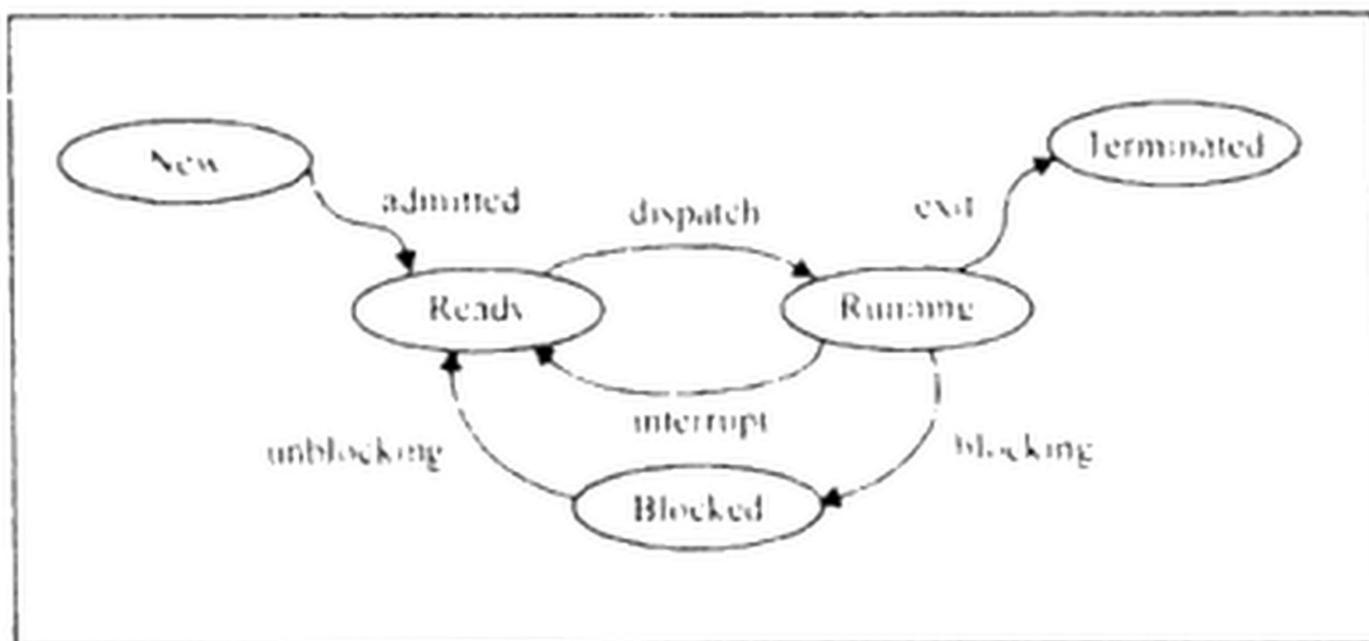5. Terminated state

States of a process are shown in the Figure 1.7

Figure 1.7 States of a Process

1. New State

This is the first state of a process when it is created. Any new operation or service that is requested by a program for execution by the processor is known as new state of process.

2. Ready State

A process is said to be in ready state when it is ready for execution but it is waiting to be assigned to the processor by the operating system.

3. Running State

A process is said to be in running state when the processor is executing it. A process is assigned to a processor for execution by operating system.

4. Blocked State/Waiting State

A process is in blocked or waiting state when it is not under execution. It is waiting for a resource to become available.

5. Terminated State

A process is m terminated state when it completes its execution.

LAB ACTIVITIES

1. Find out which type of operating system are installed in your computer lab.

Answer

Practical Work.

2. Observe the installation procedure of common types of operating system through animation/video.

Answer

Practical Work.

3. If you have visited any organization to see the working of different types of operating systems then prepare a report on it.

Answer

Practical Work.